Abstract

Metal foils, wires, and seamless tubes with increased mechanical strength are provided. As opposed to wrought materials that are made of a single metal or alloy, these materials are made of two or more layers forming a laminate structure. Laminate structures are known to increase mechanical strength of sheet materials such as wood and paper products and are used in the area of thin films to increase film hardness, as well as toughness. Laminate metal foils have not been used or developed because the standard metal forming technologies, such as rolling and extrusion, for example, do not lend themselves to the production of laminate structures. Vacuum deposition technologies can be developed to yield laminate metal structures with improved mechanical properties. In addition, laminate structures can be designed to provide special qualities by including layers that have special properties such as superelasticity, shape memory, radio-opacity, corrosion resistance etc. Examples of articles which may be made by the inventive laminate structures include implantable medical devices that are fabricated from the laminated deposited films and which present a blood or body fluid and tissue contact surface that has controlled heterogeneities in material constitution. An endoluminal stent-graft and web-stent that is made of a laminated film material deposited and etched into regions of structural members and web regions subtending interstitial regions between the structural members. An endoluminal graft is also provided which is made of a biocompatible metal or metal-like material. The endoluminal stent-graft is characterized by having controlled heterogeneities in the stent material along the blood flow surface of the stent and the method of fabricating the stent using vacuum deposition methods.